Dr John Coffin is the American Cancer Society Professor at the Sackler School of Biomedical Sciences at Tufts University.

He is also past director of and advisor to the highly successful HIV Drug Resistance Program for the National Cancer Institute (NCI), which he established in 1997. Dr. Coffin presently divides his time between Tufts University and National Cancer Institute.

Dr Coffin is an expert in retrovirology, especially understanding the interaction of retroviruses with their host cells and organisms.

Dr Coffin serves as a Member Of Scientific Advisory Board of Tocagen, Inc and was also a member of the Scientific Advisory Board of Viagene Inc. He has served on several national committees to review and create policy regarding retroviruses and disease. Dr. Coffin has over 150 scientific publications and has contributed chapters to, and been editor of, several standard textbooks on retroviruses.

In 1999, Dr Coffin was elected to membership in the National Academy of Sciences. Dr. Coffin received his PhD from the University of Wisconsin in the laboratory of Dr. Howard Temin and was a postdoctoral fellow with Dr. Charles Weissmann at the University of Zurich.

Endogenous Viruses

As a student with Howard Temin, his work was heavily influenced by Robin's key discoveries on endogenous viruses, leading into an area that was to become a major theme of his own research porogram years later. As a postdoctoral fellow, Dr. Coffin showed that retrovirus RNA is synthesized by cellular DNA-dependent RNA polymerase II, fulfilling a key prediction of the DNA provirus theory.

He went on to establish the size of the retrovirus genome at 10kb, and to develop and apply the first useful technique for mapping genes on retrovirus genomes.

As a faculty member at Tufts University, Dr. Coffin extended these concepts and approaches and combined them with genetic studies to discover a critical step in reverse transcription - the transfer of the nascent minus strand from one end of the genome to the other, mediated by the short redundant (R) sequence, which he discovered. This finding led him to propose the now well-accepted copy-choice model for retrovirus recombination. He also initiated studies of endogenous (germ-line inherited) retroviruses, which his laboratory continues to pursue today.

Genetic analysis of slow-growing and non-pathogenic endogenous avian retroviruses revealed that a region near the 3' end of the genome, now known as the U3 portion of the long terminal repeat (LTR), plays a key role in regulating virus expression by interacting with the cellular transcription machinery - a well accepted principle of retrovirology.

A major theme of his work has been endogenous proviruses as both agents and reporters of host evolutionary events. Using hybridization tools developed in the lab, he and his colleagues have identified and mapped over 150 endogenous murine leukemia (MLV) and mammary tumor virus (MMTV) proviruses in the genome of inbred mice, and demonstrated that a number of well-known mutations in mice were caused by provirus integration. They also discovered that the mysterious endogenous superantigens in mice were encoded by endogenous MMTV proviruses, thus settling some long-standing immunological, genetic, and virological puzzles.

HIV

Dr. Coffin eventually turned to the study of HIV and AIDS, where he has been studying HIV evolution and applying that understanding to the study of drug resistance, one of the most important factors limiting effective long-term therapy for HIV infection.

His 1995 paper in Science described essential characteristics of the HIV-host interaction, in particular the evolution of drug resistance, and included the correct prediction that many drug resistance mutations preexist prior to therapy. This analysis established a framework for understanding the basic and clinical science of HIV resistance.